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2       **CLAIMS**

3       1.     A method, comprising:

4           receiving an input;

5           determining if the input can be processed by an optimized filter engine and,  
6       if so, directing the input to the optimized filter engine for processing;

7           if the input cannot be processed by the optimized filter engine, directing the  
8       input to a generalized filter engine for processing;

9           processing the input to derive a result;

10          wherein the generalized filter engine is configured to handle terms of a  
11       language to which the input conforms and the optimized filter engine is configured  
12       to process a subset of the terms of the language.

13  
14       2.     The method as recited in claim 1, wherein:

15           the optimized filter engine further comprises an optimized filter sub-engine;

16           the generalized filter engine further comprises a generalized filter sub-  
17       engine; and

18           the optimized filter sub-engine and the generalized filter sub-engine are  
19       encompassed by a single filter engine.

20  
21       3.     The method as recited in claim 1, wherein the determining step  
22       further comprises recognizing whether or not the input conforms to a grammar of  
23       the optimized filter engine.

24  
25       4.     The method as recited in claim 1, wherein the input language further

1 comprises a query language based on eXtensible Markup Language (XML).

2  
3 5. The method as recited in claim 1, wherein the optimized filter engine  
4 is a first optimized filter engine and the method further comprises:

5 if the input cannot be processed by the first optimized filter engine,  
6 determining if the input can be processed by a second optimized filter engine;

7 directing the input to the second optimized filter engine if the second  
8 optimized filter engine can process the input;

9 directing the input to the generalized filter engine for processing if the  
10 second optimized filter engine cannot process the input; and

11 wherein the second optimized filter engine is configured to handle a subset  
12 of the input language, the subset of the second optimized filter engine is different  
13 than the subset of the first optimized filter engine.

14  
15 6. The method as recited in claim 1, further comprising:

16 parsing the input to determine if multiple discrete sub-expressions can be  
17 identified;

18 if sub-expressions are identified, determining if a first sub-expression can  
19 be processed by the optimized filter engine;

20 if the first sub-expression can be processed by the optimized filter engine,  
21 directing the first sub-expression to the optimized filter engine for processing;

22 if the first sub-expression cannot be processed by the optimized filter  
23 engine, directing the first sub-expression to the optimized filter engine for  
24 processing;

1       if a second sub-expression can be processed by the optimized filter engine,  
2       directing the second sub-expression to the optimized filter engine for processing;  
3       and

4       if the second sub-expression cannot be processed by the optimized filter  
5       engine, directing the second sub-expression to the optimized filter engine for  
6       processing.

7  
8       7.     The method as recited in claim 6, further comprising:  
9       obtaining a result of the processing of the first sub-expression; and  
10      processing the second sub-expression only if the result of the first sub-  
11      expression is true.

12  
13      8.     A filter engine, comprising:  
14      at least one optimized matcher configured to accept an input and process  
15      the input against a filter table associated with the optimized matcher;  
16      a generalized matcher configured to accept an input and process the input  
17      against a filter table associated with the generalized matcher;  
18      an analyzer configured to determine whether the input can be processed by  
19      the optimized matcher and, if so, directing the input to the optimized matcher for  
20      processing or, if not, directing the input to the generalized matcher for processing;  
21      and

22      wherein:  
23      the generalized matcher is configured to process all terms of an input  
24      language; and

1 the optimized matcher is configured to process only a subset of the terms of  
2 the input language.

3  
4 9. The filter engine as recited in claim 8, wherein the analyzer is further  
5 configured to analyze a new filter added to the filter engine and to determine an  
6 appropriate matcher with which to associated the new filter.

7  
8 10. The filter engine as recited in claim 8, wherein the input language is  
9 XPath.

10  
11 11. The filter engine as recited in claim 8, wherein the analyzer is  
12 further configured to determine whether the optimized matcher can process the  
13 input by comparing the input to a grammar associated with the optimized matcher  
14 and determining whether the input consists of terms that are compatible with the  
15 grammar.

16  
17 12. The filter engine as recited in claim 8, further comprising a sub-  
18 expression module that is configured to:

19 determine whether an input consists of distinct sub-expressions;

20 if the input consists of distinct sub-expressions, directing each sub-  
21 expression contained in the input to the analyzer; and

22 wherein the analyzer is further configured to determine whether a sub-  
23 expression can be processed by the optimized matcher and to direct each sub-  
24 expression to an appropriate matcher for processing.

25

1       **13.**     The filter engine as recited in claim 12, wherein a first sub-  
2 expression may be directed to the optimized matcher and a second sub-expression  
3 may be directed to the generalized matcher.  
4

5       **14.**     The filter engine as recited in claim 8, wherein the at least one  
6 optimized matcher further comprises:

7             a first optimized matcher configured to process inputs that conform to a  
8 first subset of the input language;

9             a second optimized matcher configured to process inputs that conform to a  
10 second subset of the input language; and

11            wherein the first subset and the second subset are unique subsets of the  
12 input language.  
13

14       **15.**     One or more computer-readable media containing computer-  
15 executable instructions that, when executed on a computer, perform the following  
16 steps:

17             determining an appropriate matcher to which an input message should be  
18 directed for processing against a set of queries;

19             processing the input message in a first filter engine if the first filter engine  
20 comprises a grammar that supports processing of the input message;

21             processing the input message in a second filter engine if the first filter  
22 engine grammar does not support processing of the input message; and

23             wherein:

24             the input message is in accordance with a query language;

25             the first filter engine supports a subset of the query language; and

1 the second filter engine supports the entire query language.

2  
3 16. The one or more computer-readable media as recited in claim 15,  
4 further comprising the step of accepting input messages for both filter engines by  
5 way of a single input means so that an input message sending application does not  
6 have to distinguish between the first filter engine and the second filter engine.

7  
8 17. The one or more computer-readable media as recited in claim 15,  
9 wherein the query language is XPath.

10  
11 18. The one or more computer-readable media as recited in claim 15,  
12 wherein the query language is an XML query language.

13  
14 19. The one or more computer-readable media as recited in claim 15,  
15 further comprising the steps of:  
16 analyzing the input message prior to determining which filter engine will  
17 process the input message to determine if the input message can be parsed into two  
18 or more sub-expressions;  
19 for each sub-expression identified, determining an appropriate matcher that  
20 can process the sub-expression; and  
21 directing each sub-expression to the appropriate matcher for processing.

22  
23 20. The one or more computer-readable media as recited in claim 19,  
24 further comprising the step of deriving a final result of the input message  
25 processing from at least one result of the sub-expression processing.

1  
2       **21.**     The one or more computer-readable media as recited in claim 19,  
3 further comprising the steps of:  
4       determining if a first sub-expression evaluates true;  
5       proceeding with processing of subsequent sub-expressions if the first sub-  
6 expression is true; and  
7       foregoing processing of subsequent sub-expressions if the first sub-  
8 expression is false.

9  
10       **22.**     The one or more computer-readable media as recited in claim 15,  
11 wherein each matcher includes a set of queries against which input messages  
12 directed to the respective matchers are tried, and wherein each set of queries is  
13 unique.

14  
15       **23.**     A message processing system, comprising:  
16       means for receiving a message;  
17       an optimized filter processor;  
18       a general filter processor;  
19       analyzing means for analyzing the message to determine if the optimized  
20 filter processor is configured to process the message;  
21       distribution means for distributing the message to the optimized filter  
22 processor if the optimized filter processor can process the message or to the  
23 general filter processor if the optimized filter processor cannot process the  
24 message.

1           **24.**     The message processing system as recited in claim 23, wherein:  
2           the optimized filter processor further comprises a first set of queries against  
3 which a message directed to the optimized filter processor is compared;  
4           the general filter processor further comprises a second set of queries against  
5 which a message directed to the general filter processor is compared; and  
6           the first set of queries contains fewer queries than the second set of queries.  
7

8           **25.**     The message processing system as recited in claim 23, wherein:  
9           the message conforms to an XML query language;  
10          the general filter processor is configured to support the entire XML query  
11 language; and  
12          the optimized filter processor is configured to support a subset of the XML  
13 query language.  
14

15          **26.**     The message processing system as recited in claim 25, wherein the  
16 XML query language is XPath.  
17

18          **27.**     The message processing system as recited in claim 23, wherein the  
19 optimized filter processor further comprises means for optimizing message  
20 processing over the set of queries included in the optimized filter processor.  
21

22          **28.**     The message processing system as recited in claim 27, wherein the  
23 means for optimizing message processing further comprises a hash function.  
24

25          **29.**     The message processing system as recited in claim 23, wherein:



1 the optimized filter processor is a first filter processor; and  
2 the message processing system further comprises a second optimized filter  
3 processor to which messages may be directed, the second optimized filter  
4 processor supporting a unique subset of the query language; and  
5 the distribution means is further configured to direct the message to the  
6 second optimized filter processor if the first optimized filter processor cannot  
7 process the message but the second optimized filter processor can process the  
8 message.

9  
10 **30.** The message processing system as recited in claim 23, further  
11 comprising means for parsing the message into constituent sub-expressions, and  
12 the analyzing means is further configured to process individual sub-expression as  
13 an individual message and to evaluate sub-expression processing results to derive  
14 a result corresponding to the message.

15  
16 **31.** The message processing system as recited in claim 23, wherein the  
17 message is a sub-expression of a parent message.

18  
19 **32.** The message processing system as recited in claim 23, further  
20 comprising means for determining whether a filter in the system is associated with  
21 the generalized filter processor or the optimized filter processor.